

Radiation

Safety

Committee

Minutes of Sub-Committee review of December 3, 1999 -

Removal of Steel from U-Line Dump

Present: R. Prigl, A. Stevens, A. Etkin, J.W. Glenn, G Schoeder, and D. Beavis

Motivation: Several shielding designs for the slow-beam area require steel. The request has been made to remove steel from the U-line dump. This dump was designed for high intensity operations for neutrino experiments. There are no planned high intensity operations for the downstream U-line. Steel from the back portion of the dump will be removed leaving the front portion of the beam dump intact. This would leave 37 feet of steel to act as a low intensity beam dump and shielding enclosure for the U-line cave.

The committee approved the request.

This recommendation was based on the following:

R. Prigl provided estimates of the dose rate due to muons, which would penetrate through the 37 feet of remaining steel. Muons can be generated either by the beam striking the dump or an upstream object. The dose rates are highest for upstream targets since the long decay path allows more pions to decay to muons before interacting. A fault was considered in which a 24 GeV/c proton beam with an intensity of 60 TP was transported to a thick target in the block house. A dose rate from muons out the end of the 37 feet of iron was calculated to be 70 mrem/hr. The dose rate (number of muons which penetrate the dump) is beam energy dependent. A 30 GeV/c proton beam could create a dose rate four times higher than the 24 GeV/c proton beam. The beam is prevented from being transported past the 8° bend by either RS LOTO of the 8° bend power supply or hardwired-failsafe interlocks on the 8° bend power supply. These interlocks meet the committee's guidelines to prevent faults that would allow high-energy proton beams from being transported past the 8° bend.

The 37 feet of steel is sufficient for any neutrons produced upstream.

The work planning for the steel removal should consider how surveys will be conducted to check for any potentially activated steel. It is expected that the steel was not substantially activated by previous beam operations to the dump. However, the history of the steel was not presented and it may be possible that the steel was activated from prior uses before being placed into the dump.

Moving the chipmunk from the UGE3 gate into the tunnel was considered unnecessary.

Protons are not to be transported past the 8° bend without further review by the RSC. **(CK-U-99-proton)**

The shielding changes must be documented prior to proton beam being transported to the dump. **(CK-U-99-proton)**

Ions can be transported past the 8° bend. The reduced dump is sufficient for ions due to the much lower intensity and energy per nucleon. The area where the steel is to be removed is an uncontrolled area. The work planning should have surveys conducted, if ions are being transported past the 8° bend.